ON

DISEASE OF THE MASTOID PROCESS.

BY

H. KNAPP, M.D.,

NEW YORK.

EXTRACTED FROM THE
TRANSACTIONS OF THE AMERICAN MEDICAL ASSOCIATION.

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In proposing to make some remarks on the inflammatory diseases of the mastoid process, in particular on the so-called mastoid abscess, I ask you not to expect new or original statements. I merely purpose to communicate some of the impressions which I have received from the observation and treatment of no small number of cases that have come under my care.

The importance of mastoid disease has not been underrated by the profession. All the text-books treat of it more or less extensively, and many instructive and exhaustive—if medical treatises can be called exhaustive at all—monographs on the subject have lately appeared, among which I may particularly mention those of Dr. A. H. Buck, of New York, in the *Archives of Ophthalmology and Otology* (III. 1, p. 172, etc.), of Dr. Bezold, of Munich, in the 13th volume of the *Archiv für Ohrenheilkunde*, and above all, the series of articles published by Prof. Schwartze, of Halle, in the *Archiv für Ohrenheilkunde*, from 1872 to 1879, the last having appeared a few weeks ago. Schwartze's papers contain the history of fifty cases of opening the mastoid, with critical remarks, an introduction on the anatomy of the mastoid process, and in conclusion a summary of the cases with general remarks.

Mastoid disease may be considered as primary (idiopathic) and secondary (propagated), and as external and internal; the classification, therefore, would be:—

a. *External primary*, and
external secondary;

b. *Internal primary*, and
internal secondary inflammations.

External primary inflammation of the mastoid process is a rare disease. It was, to my knowledge, first described by Voltolini, of Breslau. I have seen only a few examples of it, the most

marked of which was reported at the first International Otological Congress, and published in the Transactions of that society. The affection is characterized by absence of disease within the external meatus and middle ear, considerable pain behind the ear and in the head, fever, tenderness on pressure, redness and puffiness in the mastoid region, extending over the upper third of the sterno-mastoid muscle, but not along the jugular vein. In a week or two there is fluctuation, and an incision down to the bone liberates a moderate quantity of pus. If no incision is made, the symptoms continue to aggravate, the pus burrows underneath the periosteum toward the occiput and along the sterno-mastoid muscle down the neck into the mediastinum, being the cause of death in one of Voltolini's cases. The disease has a great tendency to affect the other ear in the course of some months. We may call it *periostitis suppurativa externa processus mastoidei idiopathica.* The treatment, if ice, rest, and aperients do not check it in its initial stage, is a deep and extensive incision.

The *secondary external inflammations* of the mastoid process are propagated thither from the external auditory canal. Of this variety I have seen a goodly number, brought about by sea-bathing and other causes. There is swelling of the wall of the meatus, especially of its outer and middle portions, which, in acute cases, after a week's duration or longer, leads to swelling of the skin immediately behind the auricle and of the auricle itself, filling up the auriculo-mastoid furrow or sinus. Very intense pain and, not unfrequently, cerebral symptoms accompany this affection, but the preservation of good hearing, the diminution of the swelling in the innermost part of the canal, and the unimportant changes of the drum-membrane, the absence of râles on inflation, as well as the absence of rhino-pharyngitis, show that the middle ear is not, or is only slightly implicated (by extension), and that the cerebral symptoms are of a reflex character, having no inflammatory meningeal origin. These cases are extensions of perichondritis and periostitis of the meatus to the periosteum of the mastoid process. Their treatment is the same: deep incision near the auricle, and, when the primary disease of the walls of the meatus is marked, deep incisions within the meatus also are indicated. As soon as, in deep-seated otitis externa, puffiness and tenderness of the auricle and post-aural region supervene, the affection of the

periosteum and its extension behind the ear are either present or imminent, and an extensive incision of the wall of the ear-canal down to the bone should not be delayed. Moist heat applied only to the inflamed part, cleanliness and keeping the opening free as long as pus is secreted, will commonly lead these cases to a rapid and favorable termination. External mastoid inflammation is more frequently propagated from disease of the middle ear and the interior of the mastoid process, than it is primary or propagated from the external ear-canal without implication of the middle ear. To this variety I shall recur later on.

Internal primary inflammation of the mastoid process has never been brought to my notice, but the *secondary inflammation* has come under my care in all its varieties as far as they are known. The great majority of them originated in acute or chronic suppuration of the middle ear, combined with or resulting from rhino-pharyngitis. In some, however, the disease originated in the external meatus, and then mostly, as far as my memory serves me, was caused by sea-bathing.

I may mention, as an example, the case of a strong man, who never had had any ear trouble until sea-bathing brought about a faint, diffuse redness of the inner portion of the meatus and of the drum membrane, besides a furuncle in the middle portion. He recovered in two weeks and went to the country. There a relapse took place; he returned, and I found circumscribed swellings both on the anterior and the posterior wall of the meatus. The hearing was good when the auricle was drawn backward. There was no pharyngitis. I advised him to fill his ear with warm water several times a day, and poultice the walls of the meatus by a flaxseed cataplasm put in fine linen in the shape of a cornucopia. The pain increased, the furuncles pointed and broke, but a few days later there was more copious purulent discharge, and both by inspection and the whistling sound on inflation the drumhead proved ruptured. I ordered rest and careful syringing of the ear. No astringents and no method of inflation employed. The naso-pharynx was healthy. The pain increased, headache and fever supervened, and the mastoid region grew red and puffy. As on the next day all these symptoms were more marked, I made a deep incision into the moderately swollen skin of the mastoid process, and, feeling by the second stroke with the scalpel that the region in the slight depression at the level of the upper wall of the meatus was less hard than the remainder of the bone, I cut into it with force, until I had pierced the outer table of the bone,

whereupon a small quantity of serous pus was evacuated. I enlarged the opening with a strong probe, and put lint over the wound. The day after, more and thicker pus was evacuated. I enlarged the opening still more, kept it patent at first by the introduction of lint, then of a permanent silver drainage-tube, which I removed and cleansed twice daily. The disease being acute and the pus of good quality, I, for some weeks, abstained from syringing the mastoid cavity, but later had to do it, and repeatedly had to remove granulations with a moderately sharp, hollow spoon (Schuft-Waldau's spoon for cataract extraction). The drum-head and meatus healed in a few weeks, but it took many more weeks before the suppuration in the mastoid cavity ceased and recovery took place.

Much more frequent are the cases in which the suppuration occurs primarily in the middle ear, and sooner or later is extended to the mastoid cells. The implication of the mastoid may in acute cases soon become so prominent as to require the opening of the process. Eleven cases of this kind were reported by Schwartze, two by Dr. Grüning, of New York, and others by other observers. This operation is always indicated, when the otorrhœa suddenly stops or diminishes, while the inflammatory symptoms in the mastoid region and the cerebral symptoms persist or grow worse. But also when the discharge through the meatus continues unabated the persistence of the cerebral symptoms may not only justify, but demand, the opening of the mastoid.

Quite recently a case came under my care where, after an exposure, acute primary otitis media occurred in a healthy man. When, after three weeks' duration, the otorrhœa continued copious, and the violent and persistent pain over the whole corresponding side of the head, greatly increased at night, did not diminish, I made a large Wilde's incision, and drilled a hole into the mastoid process at the slight depression behind the upper wall of the meatus. A considerable quantity of matter escaped. The headache disappeared from that moment, and the patient recovered rapidly.

Though the cerebral symptoms had by no means been threatening—there was neither nausea, nor vomiting, nor delirium—I thought that the continuance of the headache after the otorrhœa had set in, and the puffiness, redness, and tenderness of the mastoid region, were sufficient indications of suppuration within the mastoid process, and of an insufficient outlet of the pus. The operation proved the supposition to be true.

Chronic secondary mastoid disease is frequent and varied:—catarrhal and suppurative inflammation, formation of granulation tissue, collections of cheesy and pearly material, caries and necrosis. For brevity's sake I shall discuss this variety according as prominent symptoms furnish special indications for treatment.

In many cases the inflammatory products are retained in the mastoid, and the irritation is extended to the brain, by *granulations filling the drum-cavity* after more or less extensive destruction of the membrana tympani. Thorough cleansing and inspection of the drum-cavity should be our first step in taking charge of any case of chronic perforative inflammation. The removal of polypoid excrescences is self-evident. But even when this has been done, the otorrhœa and severe cerebral symptoms may continue. I have seen cases where excruciating headache, nausea, occasional vomiting, and delirium at night existed for weeks, yet the mastoid region was neither swollen nor red, nor sensitive to the touch, but the inner and lateral walls of the drum-cavity were lined with a thickened mucous membrane, which showed no polypoid masses, nor a particular protrusion of the inner upper wall of the meatus. The probe, in such cases, detects the fleshy character of the proliferating mucous membrane. I have found it best in such cases to scrape all the fleshy masses out, according to Oscar Wolf, and have seen severe cases rapidly recover under this treatment. The spoon which I employ for that purpose and find very excellent, and which also Bezold uses, is Schuft-Waldau's cataract spoon. It not only removes all granulation tissue, but also carious portions from the walls of the drum.

Another symptom suggestive of retention of morbid material within the mastoid cells is a *spherical protrusion of the upper-inner end of the meatus*, as first pointed out by Toynbee and Duplay. This swelling should always be incised with a slightly bent scalpel or a sharp hook-like instrument. The posterior wall of the meatus and drum-cavity, especially the upper part of the latter, should then be explored with a grooved flexible blunt hook, in order to ascertain the nature of the contents of the mastoid antrum, as well as the surface of the bone. In this way I have liberated pus, scaly masses, and cheesy material. The opening and exploration may be advantageously followed by directing a stream of warm water cautiously to the diseased

part. If the hook brings out particles of cheesy material, and syringing is of insufficient immediate effect, a warm half per cent. solution of bicarbonate of soda may be instilled several times daily, and the syringing repeated according to circumstances. I have seen that syringing in this way brought out incredible quantities of decomposed or dried-up substances which were retained in the antrum and cells of the mastoid, just as persistent and gentle syringing will bring out the accumulations in the meatus and middle ear.

Sequestra of the meatus, the drum-cavity, and the mastoid process, if projecting into the drum or meatus, are best removed by means of the grooved hollow flexible hook, which I have used and recommended for the extraction of foreign bodies from within the eyeball.[1]

The propagation of tympanic disease to the mastoid process is, so far as my experience goes, always accompanied by tenderness to the touch, redness and swelling of the mastoid region. When these symptoms were absent, and the mastoid process was opened for the relief of severe cerebral symptoms, I have always seen the operation fail to evacuate pus or any other morbid substance. As I have repeatedly witnessed such operations, I have been on my guard and warned my pupils against the indiscriminate opening of the mastoid process. Though I have never considered this operation as formidable in any degree, yet I cannot shut my eyes to its possible dangerous consequences from erysipelas and thrombosis, consequences which I have observed sufficiently to be impressed with the importance of this operation to which I resort only when unmistakable indications are present. I have spoken of these indications in acute cases. In chronic cases they are the symptoms above mentioned combined with cerebral symptoms—of which persistent pain over the corresponding half of the head is in itself sufficient—or persistent, offensive otorrhœa which does not yield to treatment of the middle ear.

There is, in addition, one symptom which we very frequently find, *fluctuating swelling behind the ear*, the so-called *post-aural abscess*. It presents itself in two varieties, which are different in their aspect as well as in their origin, as Bezold has lately pointed out. The one is a diffuse swelling of the posterior face of the auricle and the adjacent skin of the mastoid process. The

[1] Archives of Ophthalmology and Otology, pp. 311, vol. vii.

auriculo-mastoid sinus is filled up, and the auricle pushed forward as if a wedge had been driven in between it and the mastoid process. This variety is due to the periostitic and carious processes in the bony portion of the meatus, the posterior wall of the drum cavity, and the adjacent mastoid cells and antrum. The matter creeps up under the periosteum or through the tympano-petrosal fissure. The opening in these cases should be made close to the insertion of the auricle, the condition of the bone explored with a probe, carious parts cleansed, and necrosed parts removed with chisels.

In the other variety the swelling is more pronounced half an inch behind the auricle, but may extend considerably above and even in front of the ear. The auricle is not, or only slightly pushed forward, and the wedge-shaped filling of the auriculo-mastoid sinus is either absent or little pronounced. This variety results from the perforation of a true intra-mastoid abscess, and as far as my experience goes, the perforation mostly takes place in the shallow depression of the bone situated about half an inch behind and at the level of the upper wall of the external auditory meatus, or very slightly higher. It is also in this place that this variety of post-aural abscess should be opened by a deep, yet cautious incision. The surface of the bone should be explored with a probe, and I do not remember one case in which I failed to detect the communication with the mastoid cavity. If this communication be insufficient, it can readily be enlarged with a strong probe or a gouge, and the cavity of the mastoid explored. Probing of the mastoid cavity should be done in every chronic case of mastoid abscess, in order to remove morbid necrotic portions of the bony wall of the process or its cells, granulation tissue, cheesy and scaly masses (cholesteatoma), and the like. When, after the surgical or spontaneous opening of the abscess, fistulous passages remain for a long time, they are commonly due to caries and necrosis in some part of the process. The fistulous opening should be enlarged, the sequestra removed, and the disease treated according to the strict rules of surgical cleanliness, or, to use the modern expression, according to the strict rules of antiseptic surgery.

With regard to the instruments used in opening the mastoid process, I have commonly employed strong scalpels, chisel and mallet, or a hand-gouge and chisel, instruments always at hand and easy and comparatively safe of application; but Dr. Buck's

drill, surrounded with a safety canula, has likewise rendered me good service without ever having caused unpleasant accidents. I could, therefore, not so decidedly disapprove of its use as Schwartze does.

Gentlemen, I have gone over an extensive piece of ground, here and there in a hurried and dogmatic manner, for which I beg your pardon, but my remarks were limited by your time, if not by your patience. One thing, however, I may state: I have not made one assertion that was not borne out by personal experience. My inferences may have been erroneous, but your, and perhaps my own, further experience will correct the errors. Had time permitted, I would have preferred to treat of this subject statistically, furnishing the histories of cases as evidence of my statements.

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